AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (original): A self-doping type electrically conducting polymer comprising crosslinked polymer chains.

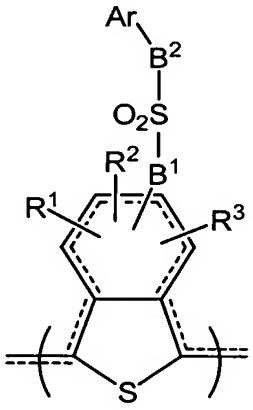
2. (original): The self-doping type electrically conducting polymer as claimed in claim 1, which has a sulfonic acid group.

3. (currently amended): The self-doping type electrically conducting polymer as claimed in claim 1 ~~or 2~~, wherein the crosslinking is formed through a sulfone bond and the sulfone bond is contained in an amount of from 1 to 90 mol% based on the repeating unit of the polymer.

4. (currently amended): The self-doping type electrically conducting polymer as claimed in claim 1 ~~any one of claims 1 to 3~~, wherein the polymer chains are crosslinked through a bond having a binding energy from 0.5 to 2 eV lower than the binding energy of the sulfonic acid group as measured by X-ray photoelectron spectrometry.

5. (currently amended): The self-doping type electrically conducting polymer as claimed in claim 1 ~~or 2~~, which contains an isothianaphthene skeleton having a sulfonic acid group.

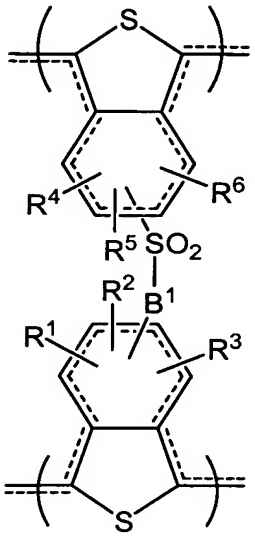
6. (original): The self-doping type electrically conducting polymer as claimed in claim 5, wherein the crosslinked structure through a sulfone bond is a isothianaphthene structure represented by formula (1)



(1)

wherein R^1 to R^3 each independently represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, a linear or branched alkoxy group having from 1 to 20 carbon atoms, a linear or branched alkenyl group having from 2 to 20 carbon atoms, a linear or branched alkenyloxy group having from 2 to 20 carbon atoms, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group, a substituted phenyl group or a $-B^1\text{-}SO_3^-M^+$ group, B^1 and B^2 each independently represents $-(CH_2)_p-(O)_q-(CH_2)_r-$, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, Ar represents a monovalent aromatic group, a substituted monovalent aromatic group, a monovalent heterocyclic group or a substituted monovalent heterocyclic group, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

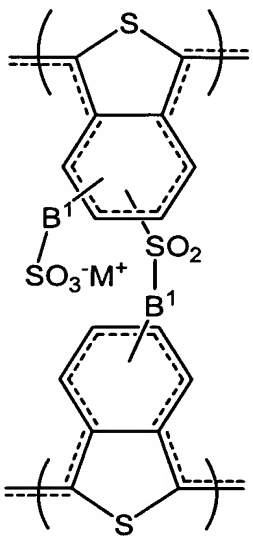
7. (original): The self-doping type electrically conducting polymer as claimed in claim 6, wherein the crosslinked structure through a sulfone bond is a structure represented by formula (2):



(2)

wherein R^1 to R^6 each independently represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, a linear or branched alkoxy group having from 1 to 20 carbon atoms, a linear or branched alkenyl group having from 2 to 20 carbon atoms, a linear or branched alkenyloxy group having from 2 to 20 carbon atoms, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group, a substituted phenyl group or a $-B^1\text{-}SO_3^-M^+$ group, B^1 represents $-(CH_2)_p-(O)_q-(CH_2)_r-$, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

8. (original): The self-doping type electrically conducting polymer as claimed in claim 7, wherein the crosslinked structure through a sulfone bond is a structure represented by formula (3)

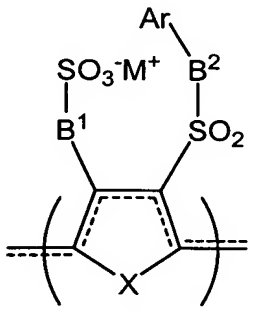


(3)

wherein B^1 represents - $(CH_2)_p$ - $(O)_q$-$(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

9. (currently amended): The self-doping type electrically conducting polymer as claimed in claim 2~~any one of claims 2 to 4~~, which contains a heterocyclic 5-membered ring skeleton having a sulfonic acid group.

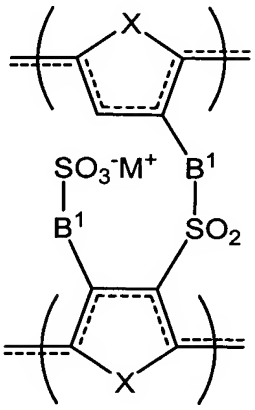
10. (original): The self-doping type electrically conducting polymer as claimed in claim 9, wherein the crosslinked structure through a sulfone bond contains a structure represented by formula (4)



(4)

wherein X represents -S-, -O- or -N (-R^{15})-, R^{15} represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, or a linear or branched alkenyl group having from 2 to 20 carbon atoms, B^1 and B^2 each independently represents - $(CH_2)_p$-$(O)_q$-$(CH_2)_r$ -, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, Ar represents a monovalent aromatic group, a substituted monovalent aromatic group, a monovalent heterocyclic group or a substituted monovalent heterocyclic group, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

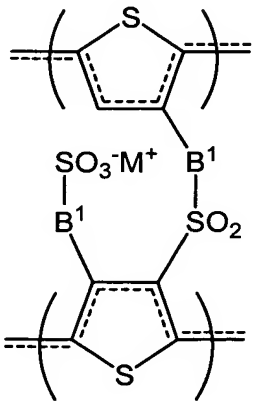
11. (original): The self-doping type electrically conducting polymer as claimed in claim 10, wherein the crosslinked structure through a sulfone bond is a structure represented by formula (5)



(5)

wherein X represents -S-, -O- or -N (-R^{15}) -, R^{15} represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, or a linear or branched alkenyl group having from 2 to 20 carbon atoms, B^1 represents - $(CH_2)_p$- $(O)_q$-$(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

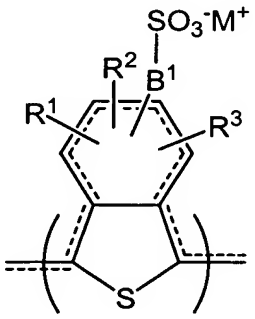
12. (original): The self-doping type electrically conducting polymer as claimed in claim 11, wherein the crosslinked structure through a sulfone bond is a structure represented by formula (6)



(6)

wherein B^1 represents - $(CH_2)_p$ - $(O)_q$- $(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

13. (original): A process for producing the self-doping type electrically conducting polymer containing a crosslinked structure through a sulfone bond represented by formula (2) described in claim 7, comprising dehydration-condensing self-doping type electrically conducting polymers having a structure represented by formula (7)

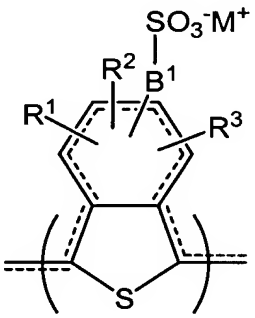


(7)

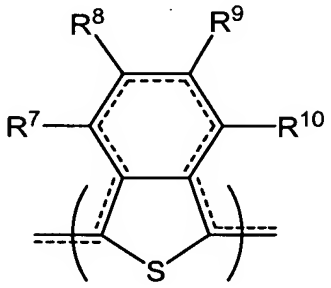
wherein R^1 to R^3 each independently represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, a linear or branched alkoxy group having from 1 to 20 carbon atoms, a linear or branched alkenyl group having from 2 to 20 carbon atoms, a linear or branched alkenyloxy group having from 2 to 20 carbon atoms, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group, a substituted phenyl group or a $-B^1$-$SO_3^-M^+$ group, with the proviso that at least one of R^1 to R^3 is a hydrogen atom, B^1 represents - $(CH_2)_p$ - $(O)_q$-$(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to

3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

14. (original): A process for producing the self-doping type electrically conducting polymer containing a crosslinked structure through a sulfone bond represented by formula (2) described in claim 7, comprising dehydration-condensing self-doping type electrically conducting polymers having a structure represented by formula (7) and/or formula (8):



(7)

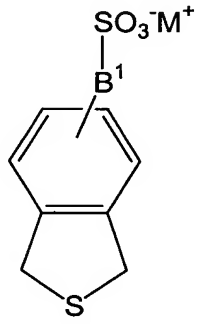


(8)

wherein R^1 to R^3 and R^7 to R^{10} each independently represents a hydrogen atom, a linear or branched alkyl group having from 1 to 20 carbon atoms, a linear or branched alkoxy group having from 1 to 20 carbon atoms, a linear or branched alkenyl group having from 2 to 20 carbon

atoms, a linear or branched alkenyloxy group having from 2 to 20 carbon atoms, a hydroxyl group, a halogen atom, a nitro group, a cyano group, a trihalomethyl group, a phenyl group, a substituted phenyl group or a $-B^1-SO_3^-M^+$ group, with the proviso that at least one of R^7 to R^{10} is a hydrogen atom, B^1 represents $-(CH_2)_p-(O)_q-(CH_2)_r-$, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

15. (original): A process for producing the self-doping type electrically conducting polymer containing a crosslinked structure through a sulfone bond represented by formula (3) described in claim 8, comprising dehydration-condensing self-doping type electrically conducting polymers obtained by (co)polymerizing a monomer represented by formula (9):

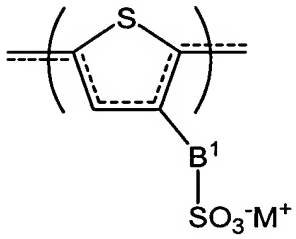


(9)

wherein B^1 represents $-(CH_2)_p-(O)_q-(CH_2)_r-$, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

16. (currently amended): The process for producing a self-doping type electrically conducting polymer as claimed in claim 13~~any one of claims 13 to 15~~, wherein the dehydration condensation reaction is performed by a heat treatment at a temperature range of 210 to 350°C.

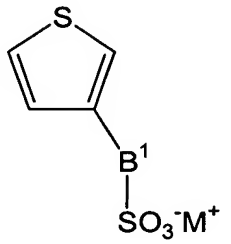
17. (original): A process for producing the self-doping type electrically conducting polymer containing a crosslinked structure through a sulfone bond represented by formula (6) described in claim 12, the process comprising dehydration-condensing self-doping type electrically conducting polymers containing a structure represented by formula (10)



(10)

wherein B^1 represents - $(CH_2)_p$ - $(O)_q$- $(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

18. (original): A process for producing the self-doping type electrically conducting polymer containing a crosslinked structure through a sulfone bond represented by formula (6) described in claim 12, comprising dehydration-condensing self-doping type electrically conducting polymers obtained by (co)polymerizing a monomer represented by formula (11)



(11)

wherein B^1 represents - $(CH_2)_p$ - $(O)_q$- $(CH_2)_r$-, p and r each independently represents 0 or an integer of 1 to 3, q represents 0 or 1, and M^+ represents a hydrogen ion, an alkali metal ion or a quaternary ammonium ion.

19. (currently amended): A self-doping type electrically conducting polymer obtained by the production process described in claim 13~~any one of claims 13 to 18~~.

20. (currently amended): An electrically conducting composition comprising the self-doping type electrically conducting polymer described in claim 1~~any one of 1 to claims 12 and 19~~, and a solvent.

21. (original): A method for producing an electrically conducting film, comprising coating the electrically conducting composition described in claim 20 on a substrate and heating it.

22. (original): The method for producing an electrically conducting film as claimed in claim 21, wherein the self-doping type electrically conducting polymer having a structure represented by formula (7) and/or formula (8) described in claim 14 is applied onto a substrate surface and then the substrate is heated at a temperature of 210 to 350°C for 1 to 600 seconds.

23. (original): The method for producing an electrically conducting film as claimed in claim 21, wherein the self-doping type electrically conducting polymer having a structure represented by formula (10) described in claim 17 is applied onto a substrate surface and then the substrate is heated at a temperature of 120 to 250°C for 1 to 600 seconds.

24. (currently amended): An electrically conducting film produced by the method described in claim 21~~any one of claims 21 to 23~~.

25. (original): The electrically conducting film as described in claim 24, wherein the film thickness is from 1 to 1,000 nm.

26. (currently amended): A coated product comprising a shaped body having coated on the surface thereof the self-doping type electrically conducting polymer described in claim 1~~any one of claims 1 to 12 and 19~~.

27. (currently amended): A coated product comprising a substrate as a shaped body, wherein one surface, both surfaces or the entire surface of the substrate is coated with the self-doping type electrically conducting polymer described in claim 1~~any one of claims 1 to 12 and 19~~.

28. (original): A coated product comprising a substrate as a shaped body, wherein one surface, both surfaces or the entire surface of the substrate is coated with the electrically conducting composition described in claim 20.

29. (currently amended): The coated product as claimed in claim 27~~or 28~~, wherein the substrate is a silicon wafer.

30. (currently amended): The coated product as claimed in claim 27~~ or 28~~, wherein the substrate is entirely or partially coated with indium tin oxide.

31. (currently amended): An electronic device comprising the self-doping type electrically conducting polymer described in claim 1~~any one of 1 to claims 12 and 19~~.

32. (original): An electronic device comprising the electrically conducting composition described in claim 20.

33. (currently amended): An organic light-emitting element comprising at least one light-emitting layer between a pair of anode and cathode, wherein the self-doping type electrically conducting polymer described in claim 1~~any one of claims 1 to 12 and 19~~ is contained in the anode buffer layer.

34. (original): The organic light-emitting element as claimed in claim 33, wherein the self-doping type electrically conducting polymer has a sulfonic acid group.

35. (currently amended): The organic light-emitting element as claimed in claim 33~~ or 34~~, wherein the self-doping type electrically conducting polymers are crosslinked through a sulfone bond.

36. (currently amended): An organic light-emitting element comprising the self-doping type electrically conducting polymer described in claim 1~~any one of 1 to claims 12 and 19~~.

37. (original): An organic light-emitting element comprising the electrically conducting composition described in claim 20.

38. (original): The organic light-emitting element as claimed in claim 33, wherein the light-emitting layer comprises a fluorescence-emitting polymer material.

39. (original): The organic light-emitting element as claimed in 33, wherein the light-emitting layer comprises a phosphorescence-emitting polymer material.

40. (currently amended): An organic EL display comprising the organic light-emitting element described in claim 33~~any one of claims 33 to 39~~.

41. (original): A display device for portable terminals, comprising the organic EL display described in claim 40.